

Explosion i ett stålverk.

940727 MARS 1800_40

Vid normal operation i satsvis drift inträffade det att höga nivåer av smält stål kom i kontakt med en vattenkyld värmeväxlare. Värmeväxlarens vägg smälte och det smälta stålet kom i direkt kontakt med vatten. Denna kontakt ledde till en explosiv förångning och/eller en termisk krackning av vattnet till syrgas och vätgas, som sedan exploderade. Sådana olyckor inträffar i mindre skala regelbundet någon om året och operatörerna känner igen förstadiet på ett mycket karakteristiskt ljud. Vid sådana tillfällen stoppas vattenflödet och ugnen töms så fort som möjligt. Tömning vid detta tillfälle var inte möjlig då den reglerande ventilen inte kunde nås på grund av ångbildningen. Räddningstjänsten tillkallades men behövde inte egentligen agera.

Inblandade ämnen och mängder

	CAS Nr.	Mängd
stål		okänt
vatten		okänt
vätgas		okänt
syrgas		okänt

Skador:

Människor:	10 anställda skadades lindrigt.
Materiella:	Avsevärd skada på ugnen. Produktionsbortfall.
Miljö/ekologi:	Inga effekter rapporterade.
Infrastruktur:	Inga.

Erfarenheter redovisade (Ja/Nej): Nej

Report Profile

Identification of Report:

country: FA ident key: 1800_040_01

reported under Seveso I directive as major accident reports: SHORT

Date of Major Occurrence: Time of Major Occurrence

start: 1994-07-27 start: 11:00:00

finish: finish:

Establishment:

name:

address:

industry: - not applicable -

Steelworks (production of high-speed steel or high-strength steel for cutting tools)

Seveso II status: not applicable: Yes art. 6 (notification): No

art. 7 (MAPP): No

art. 9 (safety report): No

Date of Report:

short: full:

Authority Reporting:

name:

address:

Authority Contact:

rep_cont_name:

rep_cont_phone:

rep_cont_fax:

Additional Comments:

a) - not applicable -

b) - not applicable -

c) - not applicable -

d) - not applicable -

e) - not applicable -

Short Report

country: FA **ident key:** 1800_040_01

Accident Types:

release: No **explosion:** Yes

water contamination: No **other:** No

fire: No

description:

Abnormal level of molten steel lead to a direct contact between metal and heat exchanger, causing local fusion of exchanger wall. Contact between steel and water lead to explosive vaporization and/or thermal cracking with production of oxy... see Appendix Short Report / description of accident types

Substance(s) Directly Involved:

toxic: No **explosive:** No

ecotoxic: No **other:** Yes

flammable: No

description:

- Molten steel (28 tonnes, liquid state)

- Water

Immediate Sources of Accident:

storage: No **transfer:** No

process: Yes **other:** No

description:

Electric steel furnace with electrodes (x2) and doors (x2) cooled with water. Doors are equipped with ring-shaped heat exchangers with a continuous circulation of water. ... see Appendix Short Report / description of immediate sources

Suspected Causes:

plant or equipment: Yes **environmental:** No

human: Yes **other:** No

description:

Cause of abnormal level of molten metal not yet investigated. Wrong type, number and location of valves controlling the cooling water system. Inadequate safety education of operators.

Immediate Effects:

material loss: Yes

human deaths: No

human injuries: Yes **community disruption:** No

other: Yes

ecological harm: No

national heritage loss: No

description:

10 employees slightly injured were brought to hospital for observation and got back home the same day. Important material damage to the furnace, other equipment and building. Temporary unemployment for several weeks, depending on steel pro... see Appendix Short Report / description of immediate effects

Emergency Measures taken:

on-site systems: Yes **decontamination:** Yes

external services: Yes **restoration:** No

sheltering: No **other:** No

evacuation: No

description:

As soon as the noise appeared, the chief operator evacuated other colleagues and tried to stop water. But massive vaporization prevented him to reach the only valve available. After the explosion, fire brigades and medical emergency services... see Appendix Short Report / description of emergency measures taken

Immediate Lessons Learned:

prevention: Yes **other:** No

mitigation: Yes

description:

New authorization required under 1976 Act, including the preparation of a safety report.... see Appendix Short Report / description of immediate lessons learned

Appendices for the FA / 1800_040_01 report

Appendix Short Report / description of accident types:

Abnormal level of molten steel lead to a direct contact between metal and heat exchanger, causing local fusion of exchanger wall. Contact between steel and water lead to explosive vaporization and/or thermal cracking with production of oxygen and hydrogen and subsequent explosion. Incidents with less severe consequences happen "regularly" (average once a yera) when some overswimming slag gets in contact with the exchanger. Operators are used to such incidents which product a characteristic noise. They normally stop general water circulation and empty the furnace as quickly as possible. State of the installation at time of accident: normal operation, batch operation

Appendix Short Report / description of immediate sources:

Electric steel furnace with electrodes (x2) and doors (x2) cooled with water. Doors are equipped with ring-shaped heat exchangers with a continuous circulation of water. Water flow is controlled with a single manual valve common to all 4 exchangers.

Appendix Short Report / description of immediate effects:

10 employees slightly injured were brought to hospital for observation and got back home the same day. Important material damage to the furnace, other equipment and building. Temporary unemployment for several weeks, depending on steel production and transfer from the Swedish plant. Heavy economical consequences foreseen on a week and poorly insured company.

Appendix Short Report / description of emergency measures taken:

As soon as the noise appeared, the chief operator evacuated other colleagues and tried to stop water. But massive vaporization prevented him to reach the only valve available. After the explosion, fire brigades and medical emergency services were called and mobilized with no actual participation.

Appendix Short Report / description of immediate lessons learned:

New authorization required under 1976 Act, including the preparation of a safety report.

Number, type and location of valves for the control of water circulation will be redefined after full risk evaluation in the framework of the authorization grant procedure.